CLAIMS:

1. A video encoder comprising:

a coder for encoding vectors to describe at least an image block with respect to at least a reference block;

a short term reference block buffer storing at least one short term reference block; and

at least one long term reference block buffer storing at least one long term reference block;

wherein the coder selectively chooses between encoding with respect to the at least one short term reference block in the short term reference block buffer and the at least one long term reference block in the long term reference buffer based upon one or more factors examined at the time of encoding to maximize one of compression, video quality, and a metric balancing compression and video quality.

2. The encoder of claim 1, wherein the coder for encoding selectively chooses the at least one long term reference block when a connection used by the video encoder changes to a lower quality.

3. The encoder of claim 1, wherein the coder for encoding selectively chooses the at least one long term reference block when a connection used by the video encoder is anticipated to be changing to a lower quality.

4. The encoder of claim 1, wherein the coder for encoding selectively chooses the at least one long term reference block to encode background data and selectively chooses a more recent reference block to encode foreground data.

5. The encoder of claim 4, wherein the more recent reference block comprises an immediate past reference block.

6. The encoder of claim 5, wherein the at least one long term reference block comprises at least a block immediately preceding the immediate past reference block.

7. The encoder of claim 1, wherein the one or more factors examined at the time of encoding include one or more of: the encoder's expectation of distortion at a decoder, a number of frame buffers in the encoder, the size of frame buffers in the encoder, any feedback from the decoder, a history of changing data channel quality, a history of the changing image region quality to selectively choose, for each at least one block being encoded, between the at least one long term reference block and the at least one short term reference block to maximize one of compression, video quality and a metric balancing compression and video quality..

8. The encoder of claim 7, wherein the one or more factors examined at the time of encoding are further used to determine when to update the at least one long term reference buffer.

9. The encoder of claim 1, wherein the encoder comprises a plurality of long term reference block buffers.

10. The encoder of claim 9, wherein the recent reference block comprises the immediate past reference block.

11. The encoder of claim 1, wherein the coder selectively chooses between coding using the at least one long term reference block (INTER coding) and using INTRA coding.

12. The encoder of claim 11, wherein the coder conducts a fractional pixel accuracy encoding, by, determining, for the at least one long term reference block and on a fractional pixel grid,

original pixel positions including pixels that coincide with an actual pixel position;

horizontally or vertically interpolated pixel positions including pixels that lie between two original pixel positions; and

diagonally interpolated pixel positions.

13. The encoder of claim 12, wherein:

first moments of the horizontally or vertically interpolated pixel positions and the diagonally interpolated pixel positions are calculated directly; and

second moments of the horizontally or vertically interpolated pixel positions and the diagonally interpolated pixel positions are estimated.

14. The encoder of claim 1, wherein the at least one long term reference block buffer comprise a multiple frame buffer, and the encoder coder selectively chooses between coding using the reference block (INTER coding) and using INTRA coding.

15. The encoder of claim 14, wherein the coder chooses between two types of INTER coding and the INTRA coding, the two types of INTER coding comprising coding using the at least one short term long term reference block (ST) and the at least one long term long term reference block (LT), and wherein;

the coder computes moments for the INTRA coding and the ST block using a recursive optimal per pixel estimate treating elements of a previous block as a random variable; and

the coder computes moments for the LT block using a recursive optimal per pixel estimate treating elements of a previous block as a random variable.

16. The encoder of claim 15, wherein the LT block is updated and the coder receives decoder feedback and uses the feedback to determine when to update the LT block.

17. The encoder of claim 16, wherein the coder uses the feedback to synchronize the long term reference buffer.

18. The encoder of claim 14, wherein the at least one long term reference block comprises a block in a region of interest.

19. The encoder of claim 1, wherein the at least one long term reference block comprises a composite frame.

20. The encoder of claim 1, wherein the at least one long term reference block comprises a long term reference frame and the coder encodes a frame on a block by block basis.

21. A method for video encoding, the method comprising steps of:

normally encoding and storing normal quality reference frames;

also encoding and storing a high quality reference frame;

using the high quality reference frame to encode all or a portion of a frame being encoded.

22. The method of claim 21, wherein the high quality reference frame comprises a frame from a high quality channel condition and it is used when a high quality channel condition is replaced by a low quality channel condition.

23. The method of claim 22 wherein the high quality reference frame encodes background data during periods of low quality channel conditions.

24. The method of claim 22, including a step of periodically or sporadically allocating bandwidth for preparing the high quality reference frame.

25. The method of claim 24, wherein said step of periodically or sporadically allocating comprises a client starving preceding and subsequent bandwidth periodically or sporadically to create a high quality frame.

26. The method of claim 24, wherein said step of periodically or sporadically allocating comprises a server periodically or sporadically providing bursts of bandwidth for high quality encoding by clients.

27. The method of claim 21, wherein said step of using is conducted in response to or in anticipation of a condition that will adversely affect a channel over which the frame being encoded is to be transmitted

28. A method for decoding video, the method comprising steps of:

receiving encoded video; and

selectively choosing to use a stored high quality long-term frame to improve a frame being decoded, whether or not the encoded video was encoded using the high-quality long term frame when encoding a current frame being decoded, to improve a current frame being decoded.

29. A video encoder, comprising:

a plurality of frame buffers, with at least two frame buffers storing video frame information from non-consecutive frames;

a coder for coding video frames with reference to information stored in one or more of said plurality of frame buffers; and

control logic for updating said plurality of frames buffers by choosing one of jump updating or continuous updating or general updating or an arbitrary non-periodic updating according to freely selectable update parameters.

30. The encoder of claim 29, wherein the freely selectable update parameters remain fixed while coding one video sequence.